

WHAT IS CLAIMED IS:

1. An image processing apparatus, comprising:
  - an isolated dot discriminating portion judging, for each of a plurality of pixels included in an image, whether the pixel corresponds to a center pixel of an isolated dot;
  - 5 a size detector detecting an isolated dot size;
  - a dot region discriminating portion judging whether a target pixel is included in a dot region based on a position of said pixel judged as being the center pixel of the isolated dot; and
  - a dot region determining portion determining a dot region based on a position of said target pixel judged as being included in the dot region and
  - 10 said isolated dot size detected.
2. The image processing apparatus according to claim 1, wherein said isolated dot discriminating portion includes
  - a plurality of calculators, each using a filter having sensitivity corresponding to an isolated dot size different from each other to calculate
  - 5 an evaluation value corresponding to the relevant isolated dot size for each process-target pixel, and
  - a comparator comparing the evaluation values calculated by said plurality of calculators with prescribed threshold values.
3. The image processing apparatus according to claim 1, wherein said dot region discriminating portion includes
  - a counter counting the number of center pixels of isolated dots existing within a prescribed range from a process-target pixel, and
  - 5 a comparator comparing said counted number of the center pixels of the isolated dots with a predetermined threshold value.
4. The image processing apparatus according to claim 3, wherein said counter counts the number of the center pixels of the isolated dots of all sizes regardless of the isolated dot sizes.

5. The image processing apparatus according to claim 3, wherein  
said counter counts the number of the center pixels of the isolated  
dots separately for each isolated dot size, and

5 said comparator compares the number of the center pixels of the  
isolated dots of the isolated dot size having been determined to exist in a  
greatest number with said threshold value.

6. The image processing apparatus according to claim 3, wherein  
said counter counts the number of the center pixels of the isolated  
dots separately for each isolated dot size, and

5 said dot region discriminating portion judges that said process-target  
pixel is not included in a dot region when said comparator determines that  
the number of the center pixels of the isolated dots of the isolated dot size  
existing in a greatest number and the number of the center pixels of the  
isolated dots of the isolated dot size existing in a next greatest number both  
exceed said threshold value.

7. The image processing apparatus according to claim 3, wherein  
said counter counts the number of the center pixels of the isolated  
dots separately for each isolated dot size, and

5 said dot region discriminating portion judges that said process-target  
pixel is included in a dot region when a sum of the number of the center  
pixels of the isolated dots of a first isolated dot size existing in a greatest  
number and the number of the center pixels of the isolated dots of a second  
isolated dot size different from said first isolated dot size exceeds said  
threshold value even if the number of the center pixels of the isolated dots  
10 of said first isolated dot size does not exceed said threshold value.

8. The image processing apparatus according to claim 3, wherein  
said dot region determining portion includes

5 a tentative region determining portion determining a region within  
said prescribed range as a tentative region based on positions of the pixels  
judged as being included in the dot region, and

a correcting portion correcting said determined tentative region based on said detected isolated dot size.

9. The image processing apparatus according to claim 8, wherein said correcting portion includes an expanding portion expanding said tentative region by the number of pixels of not greater than half said detected isolated dot size.

5 10. The image processing apparatus according to claim 1, further comprising a processor performing prescribed processing on the image, said processor changing a level of said prescribed processing to be performed on said determined dot region in accordance with said detected isolated dot size.

11. The image processing apparatus according to claim 10, wherein said prescribed processing is smoothing.

12. The image processing apparatus according to claim 10, wherein said prescribed processing is edge enhancement.

13. The image processing apparatus according to claim 10, wherein said level includes a level where no processing is performed.

5 14. The image processing apparatus according to claim 1, wherein said dot region discriminating portion judges that the process-target pixel is included in a dot region when said process-target pixel is included in a smallest rectangular region including the center pixels of the isolated dots, and

said dot region determining portion determines the dot region to include said process-target pixel and peripheral pixels within a range of the number of pixels of not greater than half said detected isolated dot size from said process-target pixel.

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15. An image processing program product making a computer perform the steps of:  
detecting a center pixel of an isolated dot from an image;  
detecting an isolated dot size;  
5 extracting a tentative region based on a position of said detected center pixel of the isolated dot; and  
determining a dot region by correcting said extracted tentative region based on said detected isolated dot size.

16. The image processing program product according to claim 15, wherein said detecting step further includes the step of comparing output values calculated by using a plurality of filters having sensitivity corresponding to different isolated dot sizes based on a pixel value of a  
5 process-target pixel and pixel values of peripheral pixels within a prescribed range from said process-target pixel.

17. The image processing program product according to claim 15, wherein said extracting step includes the steps of  
counting the number of center pixels of isolated dots existing within a prescribed range from a process-target pixel, and  
5 comparing said counted number of the center pixels of the isolated dots with a predetermined threshold value.

18. The image processing program product according to claim 17, wherein said counting step includes the step of counting the number of the center pixels of all the isolated pixels irrelevant to the isolated dot sizes.

19. The image processing program product according to claim 17, wherein  
said counting step includes the step of counting the number of the center pixels of the isolated dots separately for each isolated dot size, and  
5 said comparing step includes the step of comparing the number of the center pixels of the isolated dots of the isolated dot size determined to

exist in a greatest number with said threshold value.

20. The image processing program product according to claim 17, wherein

said counting step includes the step of counting the number of the center pixels of the isolated dots separately for each isolated dot size, and

5        said extracting step includes the step of judging that said process-target pixel is not included in said tentative region when it is determined in said comparing step that the number of the center pixels of the isolated dots of the isolated dot size existing in a greatest number and the number of the center pixels of the isolated dots of the isolated dot size existing in a  
10        next greatest number both exceed said threshold value.

21. The image processing program product according to claim 17, wherein

said counting step includes the step of counting the number of the center pixels of the isolated dots separately for each isolated dot size, and

5        said extracting step includes the step of judging that said process-target pixel is included in said tentative region when it is determined by said comparing step that a sum of the number of the center pixels of the isolated dots of a first isolated dot size existing in a greatest number and the number of the center pixels of the isolated dots of a second isolated dot  
10        size different from said first isolated dot size exceeds said threshold value even if the number of the center pixels of the isolated dots of said first isolated dot size does not exceed said threshold value.

22. The image processing program product according to claim 17, wherein said extracting step includes the step of extracting, as the tentative region, a region within said prescribed range with respect to a position of the process-target pixel that is determined to exceed said  
5        threshold value by said comparing step.

23. The image processing program product according to claim 15, wherein said extracting step includes the step of extracting, as the

tentative region, a rectangular region circumscribing the center pixels of the isolated dots.

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24. The image processing program product according to claim 15, wherein said determining step includes the step of expanding said extracted tentative region by the number of pixels of not greater than half said detected isolated dot size.

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25. The image processing program product according to claim 24, wherein said determining step includes the step of expanding said extracted tentative region based on the isolated dot size of the isolated dots whose center pixels are included in a greatest number in said tentative region.

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26. The image processing program product according to claim 15, making the computer further perform the steps of:

performing prescribed processing on the image; and

changing a level of said prescribed processing to be performed on said determined dot region in accordance with said detected isolated dot size.

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27. The image processing program product according to claim 26, wherein said level changing step includes the step of changing the level of said prescribed processing based on the isolated dot size of the isolated dots whose center pixels are included in a greatest number in said tentative region.

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28. The image processing program product according to claim 26, wherein said prescribed processing is smoothing.

29. The image processing program product according to claim 26, wherein said prescribed processing is edge enhancement.

30. The image processing program product according to claim 26, wherein said level includes a level where no processing is performed.

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